PATENT SPECIFICATION

DRAWINGS ATTACHED

1,162,013

1,162,013

Date of Application and filing Complete Specification: 9 Nov., 1966.

No. 50254/66.

Application made in United States of America (No. 507022) on 9 Nov., 1965.

Complete Specification Published: 20 Aug., 1969.

Index at acceptance: —B8 K(2K1, 2K3, 2K4, 2X5)

International Classification: —B 65 d 33/00

COMPLETE SPECIFICATION

Vented Closure Structures for Industrial Shipping Bags

We, UNION CARBIDE CORPORATION, A Corporation organised under the laws of the State of New York, United States of America, of 270 Park Avenue, New York, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to vented industrial shipping bags which are fabricated from air-impervious materials.

An increasing number of industrial shipping bags are presently being provided from air-impervious materials such as plastic coated paper, metal foils, thermoplastic films and the like, as well as various combinations thereof. Generally, these industrial shipping bags are automatically packed with fine granular or powdery materials such as synthetic organic polymer resins, pulverized coal, kaolin, silica flour, gypsum, tri-sodium phosphate, cement, lime, cornstarch, wheat, flour and the like.

The apparatus used to pack these industrial shipping bags usually employ pneumatic means which fluidize the materials to be stored and convey them into the bags in a fluidized state. Fluidizing air is thereby often packed in the industrial shipping bags along with the fluidized products.

Other apparatus, which is used to pack industrial shipping bags, drops a pre-weighed charge of material through a funnel-like device into an open end of the bag. During this procedure, also, air is entrained along with the material and entrapped in the bag.

Still another means by which air is entrapped in these industrial shipping bags occurs when the configuration of the bag changes from a rectangular shape to a cylindrical shape upon being filled. Since cylindrical objects are difficult to stack, particularly in a horizontal position, these bags are generally filled to only three-fourths of their potential volume capacity in order to obtain a filled bag which is flatter and has a more rectangular shape enabling them to be horizontally stacked with greater ease. Hence, the air entrapped at the top of these partially filled bags must also be permitted to escape in order to obtain a flatter, more rectangular shape and, thereby, facilitate horizontal stacking of these bags.

Due to the air-impervious nature of these shipping bags, a great deal of difficulty has been encountered in separating the entrapped air from the product. Various techniques and apparatus have been employed to overcome this difficulty, yet none have been completely successful in eliminating this problem. As a result, a significant amount of air remains entrapped in the industrial shipping bag after packing is completed. This entrapped air is undesirable since it can also cause the shipping bag to rupture or burst during subsequent handling.

It is an object of this invention, therefore, to provide an air-impervious, industrial shipping bag having a vent structure capable of permitting entrapped air in the bag to escape to atmosphere.

According to the present invention, an industrial shipping bag fabricated from air-impervious material and having at least one end closure, is characterized in that the side walls of the bag or the side walls of a lateral gusset of said bag are discontinuously joined across a corner portion of the bag in the vicinity of the end closure, the pocket thus formed at such corner portion communicating through the free areas of the joint with the interior of the bag, and that at least one of the side walls of said pocket comprises one or more apertures communicating with the exterior.

Since the pocket communicates through the free areas of the joint with the interior of the bag and through the aperture or apertures in the side wall with the exterior, the entrapped air in the bag can freely escape to the atmosphere.

The present invention includes within its scope various types of air-impervious industrial shipping bags. Furthermore, although a great many of the air-impervious industrial shipping bags presently in use are fabricated from thermoplastic materials such as polyethylenes, polyvinylchlorides, polyolefins and the like, as well as combinations thereof, it should be understood that the present invention is not limited to industrial shipping bags fabricated from these materials. Nevertheless, since industrial shipping bags fabricated from thermoplastic materials can be readily heat-sealed, their use is preferred. The manner in which heat-seals can be formed and selectively placed in industrial shipping bags fabricated from thermoplastic materials requires no further elaboration since these techniques are well known to those skilled in the art.

While the present invention is further described hereinbelow with specific reference to industrial shipping bags of the gusset type, it should also be understood that this is only one embodiment thereof. Thus, the industrial shipping bags comprising the modification of the present invention may be of the rectangular or square-end type, the pillow type and the like; all of which are well known to those skilled in the art.

In the accompanying drawings:

Figure 1 is a cut-way perspective view of one embodiment of the present invention;

Figure 2 is a cut-away front elevational view thereof; and

Figure 3 is an exaggerated cut-away isometric view of one corner thereof.

Referring now to the drawing, wherein like reference numerals denote like parts, there is shown, in Figures 1 and 2, an air-impervious, gusseted industrial shipping bag generally designated by reference numeral 10, and fabricated in the usual manner from seamed or seamless, tubular thermoplastic material. The gussets in the industrial shipping bag 10 are generally designated by reference numerals 12 and 12a, each gusset having an inner fold 14 and 14a and outer folds 16 and 16a.

As is well known in the art, gussets are formed in flattened, tubular thermoplastic films by infolding a portion of the opposed edges thereof so that they are substantially parallel to the longitudinal axis of the industrial shipping bag. Hence, gusset 12, for example, can be further described as having two pairs of opposed plies of material A, B, and C, D, each pair of which forms opposed sides of gusset 12. Similarly, gusset 12a has two pairs of opposed plies of material A′, B′ and C′, D′ which form opposed sides of gusset 12a.

At the lower end of the gusseted industrial shipping bag 10, there is provided a heat-seal 18 which forms the bottom closure for the gusseted bag by heat-sealing all the plies comprising gusset 12 (A, B, C and D) to each other in their common areas of overlap and, in like manner, heat-sealing all the plies comprising gusset 12a (A′, B′, C′ and D′) to each other in their common areas of overlap. The bottom closure of the gusseted bag is then completed by heat-sealing together the opposed side walls E and F in their common areas of overlap so that the heat-seal 18 comprising the bottom closure of the gusseted bag is a continuous heat-seal, extending across the entire width of the gusseted bag and transverse to the longitudinal axis of the gusseted bag.

It should be understood that, although the bottom closure of the gusseted bag has been described as being obtained by heat-sealing, this is not critical. Other means, such as gluing, stitching and the like can be similarly employed and the same results obtained. In like manner, a plurality of heat-seals or stitching or combinations of heat-seals, stitching, gluing and the like can be used to form the bottom closure.

In each corner of the gussets 12 and 12a there are provided diagonal heat-seals 20 and 20a, respectively. While only two diagonal heat-seals are shown, there are preferably four such diagonal heat-seals, one in each corner of the opposed sides comprising the gussets. In this manner, a symmetrical bag is obtained when it is filled having a neater appearance and providing a filled bag which is more easily stackable.

The diagonal heat-seal 20 seals the opposing plies A, B to each other in their common area of overlap to form one side of gusset 12 as heat-seal 20a similarly seals opposing plies A′, B′ of gusset 12a. In the same manner, plies C, D and C′, D′ are also provided with diagonal heat-seals in gussets 12 and 12a, respectively, so that a pair of opposed gusset sides A, B and C, D are formed in gusset 12 and a pair of opposed gusset sides A′, B′ and C′, D′ are formed in gusset 12a. In the most preferred embodiment of the present invention, the diagonal heat seals in the opposing halves of each gusset are superimposable on each other when the gusseted bag 10 is in a flattened or unfilled condition as shown in Figure 2.

The diagonal heat-seals, 20 and 20a, are positioned adjacent to the bottom closure heat-seal 18 but do not intersect, and, preferably, do not meet heat seal 18 so that a free area is formed therebetween through the pairs of opposed plies forming the opposite sides of gussets 12 and 12a. The diagonal heat-seals also, preferably, do not extend to the inner

fold lines 14 and 14a of gussets 12 and 12a, respectively. In a more preferred embodiment of the present invention, the diagonal heat-seals also do not extend to the outer folds, 16 and 16a, of the gussets 12 and 12a. In this manner, an additional free area is provided at the other end of the diagonal heat-seals in the pairs of plies forming the opposed sides of each gusset.

Although only one diagonal heat-seal is shown and described in each corner of the gussets, it should be understood that a plurality of such heat-seals can be similarly provided in one or more gusset corners to produce a maze through which the entrapped air must flow. These heat-seals can be parallel to each other or they can be discontinuous and/or various geometric configurations. Similarly, while it is preferred to have a diagonal heat-seal in each gusset corner, only one gusset corner need be thus provided or any combination of gusset corners can contain such seals.

In the area defined by the diagonal heat-seals, the bottom closure, and the side edge of the bag, there is provided an opening or aperture 22 and 22a. These openings or apertures 22 and 22a extend through the pairs of plies forming the opposed gusset sides of each gusset so that there are preferably four such openings or apertures, one in each gusset. For example, in gusset 12, there is an aperture or opening 20 which is common to plies A and B and another opening or aperture (not shown) which is common to plies C and D. The same would also be true for plies A', B' and C', D' in gusset 12a. As with the diagonal heat-seals, these apertures or openings are also preferably superimposable on each other when the bag is in a flattened or unfilled condition.

It should be further understood that the shape of the openings or apertures is not critical. Any shape or geometric pattern desired can be readily employed such as, for example, oval, round, eliptical, star-shaped, triangular and the like, as well as combinations thereof. The number of openings or apertures in each gusset corner is also not critical; provided they are not so numerous or so large as to permit dust and dirt particles in the atmosphere to enter therethrough into the bag and thereby endanger the bag contents with possible contamination nor permit the contents packed in the bag to sift out. One or more such apertures or openings can be placed in each gusset corner or only in one gusset corner or in any combination of gusset corners. However, at least one such aperture or opening is provided in at least one gusset corner.

Upon filling a gusseted, industrial shipping bag as illustrated, at least one gusseted corner thereof will assume the approximate shape depicted in Figure 3. As shown therein, the gussets expand to substantially eliminate the inner gusset fold 14 except in the extreme corner thereof where the bottom heat-seal 18 has sealed all the plies of the gusset to each other.

The area between the plies A, B and C, D of gusset 12 are now filled with material except where these plies are heat-sealed to each other as, for example, plies A, B by diagonal heat-seal 20.

As more and more air is entrapped in the bag, pressure will begin to build up against the walls of the bag. As is well known, air, when under pressure, will tend to flow toward the point which offers the least resistance. In the present invention, these areas of least resistance are provided by the free areas surrounding the diagonal heat-seals, such as diagonal heat-seals 20 in Figure 3, and between the plies formerly comprising the opposed sides of the gussets, such as plies A, B of gusset 12 in Figure 3. Due to the manner in which heat-seal 20 (Figure 3) is positioned with respect to heat-seal 18 and opening 22, these free areas also communicate with the opening 22. Hence, these areas of least resistance permit air to flow therethrough and thereby allow entrapped air to escape to the atmosphere through the openings. In Figure 3, this is depicted by the arrowed lines 24 which illustrate the route that the entrapped air would follow, through the free areas surrounding diagonal heat-seal 20 and between plies A and B, shown by the dotted portion of the arrowed lines 24, thence through the opening 22 to escape to the atmosphere, shown by the solid portion of arrowed lines 24. In this manner, air entrapped in the bag is vented to the atmosphere thereby relieving the bag of unnecessary build-up in air pressure which could cause the bag to burst during filling or subsequent handling. Additionally, by providing such means for venting entrapped air, the bags can be filled to their true weight capacity thereby resulting in an economic saving.

WHAT WE CLAIM IS:—

1. An industrial shipping bag fabricated from air-impervious material and having at least one end closure, characterized in that the side walls of the bag or the side walls of a lateral gusset of said bag are discontinuously joined across a corner portion of the bag in the vicinity of the end closure, the pocket thus formed at such corner portion communicating through the free areas of the joint with the interior of the bag, and that at least one of the side walls of said pocket comprises one or more apertures communicating with the exterior.

2. A bag according to Claim 1, characterized in that said side walls are joined by a diagonal seal or a plurality of parallel diagonal seals, each extending toward but not

meeting the end closure and/or the adjacent side edge of the bag.

3. A bag according to Claim 2, comprising at least one lateral gusset, characterized in that the diagonal seals in the opposing halves of each gusset are superimposable when the empty bag is in a flattened condition.

4. A bag according to any of Claims 1 to 3, fabricated from thermoplastic film, characterized in that the jointure between said side walls is by a heat seal.

5. An industrial shipping bag as hereinbefore particularly described and claimed in claim 1.

6. An industrial shipping bag as hereinbefore particularly described with reference to and as illustrated in, the accompanying drawings.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden,
London, E.C.1,
Chartered Patent Agents,
Agents for the Applicant(s).

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1969.
Published by the Patent Office, 25, Southampton Buildings, London, W.C.2. from which copies may be obtained.

1162013 COMPLETE SPECIFICATION

1 SHEET This drawing is a reproduction of the Original on a reduced scale

Fig.1.

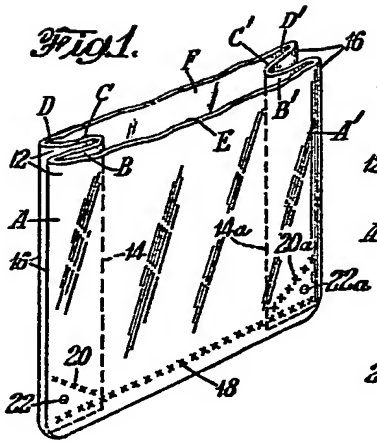
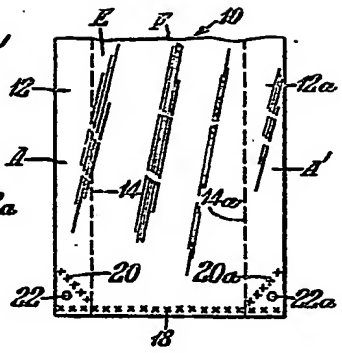


Fig.2.



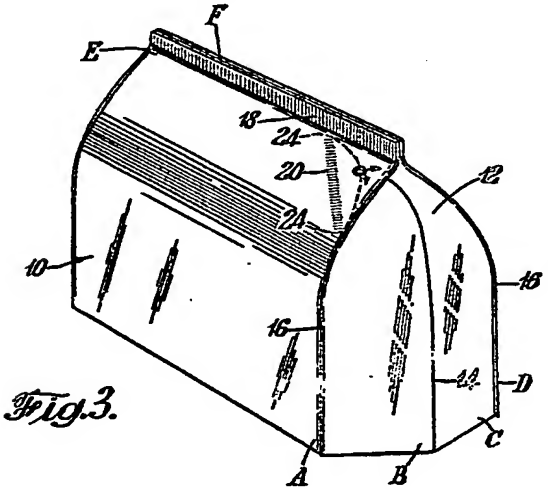


Fig.3.